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A Simulation Analysis Based on Peruvian Data

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THE SMALL SEMI-INDUSTRIALIZED ECONOMY AND ITS BALANCE OF PAYMENTS ADJUSTMENT MECHANISM

A. Structure of the Small Semi-Industrialized Economy

The small semi-industrialized economy today is typically a graduate of an import substituting industrialization policy. It therefore exports primary goods and imports raw materials and intermediate goods which it processes domestically behind high tariff barriers or behind quantitative restrictions. Imports are non-competitive with domestic production. Industrial exports may or may not exist depending on the nature of the international trade policy. Industrial costs are typically well above world market prices, resulting from backward integration of the industrial structure behind the high import restrictions. While on domestic sales the high input costs are compensated by either higher tariffs or quotas on the finished product, thus yielding positive effective protection for sales on the domestic market, symmetric protection is rarely supplied for industrial exports. In the absence of vigorous export promotion, negative effective protection on export sales ensues and industrial production for export markets becomes unprofitable. 1/

The impact of the trade policy on the structure of trade can be visualized easily by interpreting the composite of exchange rate and trade taxation measures as an implicit multiple exchange rate system. A typical structure of such an exchange rate system is shown in Table 1.1. There it

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1/ The documentation of anti-export bias is voluminous. See, for instance, Little, Scitovsky and Scott (1970), Balassa and Associates (1971), Balassa and Associates (1980, forthcoming).

Table 1.1

The Typical Exchange Rate System of a Semi-Industrialized LDC

"Pesos"per Dollar

Product	Market	Financial Rate	Trade Taxation	Total Rate
Primary export	Domestic	10	-	10
	Export	10	-	10
Financial	-	10	-	10
Raw Material	Domestic	10	20%	12
	Export	10	-	10
Semi-Manufacturers I	Domestic	10	35%	13.5
	Export	10	-	10
Semi-Manufactures II	Domestic	10	50%	15
	Export	10	-	10
Finished Products	Domestic	10	80%	18
	Export	10	-	10

can be seen that the "total exchange rate" is the result of compounding the financial rate with the trade taxation. The escalation of the tariff produces successively higher rates for raw materials, different kinds of manufacturers, and finished products. Production costs at higher stages of transformation are affected by total exchange rates of the lower stages, however the cascading in the rates produces profitability of sales on the domestic market despite the excess of the cost exchange rates over the financial rate.

When, however, export sales are at issue, the level of the cost exchange rate becomes crucial to the possibility for competing in world markets. In the case of the table, the cost exchange rate for the average product is of the order of 35 or 50 percent above the financial rate as far as material inputs are concerned. Labor costs, however, will also be affected by the tariff system insofar as the supply of labor depends on the real wage and consumption goods are affected by the tariff on finished goods. Thus, in this example, the cost exchange rate for wages will be an average of 18 for finished products with 10 for food, yielding perhaps a "wage exchange rate" of 13. Finally, the total exchange rate for capital goods must be taken into account too. In sum, the average cost exchange rate for all inputs is likely to be of the order of 13 or so. If no export support is provided under such circumstances, the export rate will be ten and exports are unlikely to be profitable. On the other hand, if export promotion measures are in place, and the export exchange rate is sufficiently high, a number of activities will find sales in the foreign market attractive, depending on the interaction between the industry's specific cost exchange rate and the export rate available.

It is worth noting that this structure of the implicit multiple exchange rate system tends to cause misleading evaluations of the efficiency of industrial production in semi-industrialized LDC's. Thus, for example, if one takes domestic costs of production and divides them by the "exchange rate" to obtain the dollar equivalent for comparison with world (import) prices, one will generate an overstatement of excess costs. This "inefficiency illusion" arises because the exchange rate used is naturally the financial rate, while the domestic producer's cost is based on the total rate affecting these inputs on the average. Since this cost exchange rate is invariably above the financial rate, the distortion caused by using the latter for the cost comparison may be quite considerable. In the example used previously, the producer's cost rate was 13, transforming this cost to dollars with an exchange rate of 10 would produce an overstatement of 30%. Unfortunately, the actual cost exchange rates for individual producers are not usually available, and thus the simple comparison of domestic costs with world prices using the financial exchange rate is the common one, and leads both policy makers and industrialists to the conviction that industry in the semi-industrialized economy is much more inefficient that in fact it is.[1/]

B. The Adjustment Process

How the small semi-industrialized economy adjusts to an external shock, say a reduction in the volume of its exports of traditional goods or a reduction in the price of such goods, depends crucially on whether it does or not export manufactures as well. If no manufactures are exported, the loss of

1/ See Schydlowsky (1972) for an early discussion of this problem and Berlinsky and Schydlowsky (1977) for a careful quantification for Argentina.

export income will cause a reduction in the level of domestic economic activity through the foreign trade multiplier. The induced fall in domestic demand may cause a reduction in the relative price of non-export goods and thereby may induce a shift in the composition of domestic final demand towards such non-export goods, thereby moderating the deflation somewhat.

However, the scope for change in relative prices in semi-industrialized economies is severely limited for several reasons:

(i) most industrial and services production occurs under constant or declining costs,

(ii) most industrial goods and most services have significant import components, the price of which do not fall with a reduction in domestic demand,

(iii) wages in these economies are typically rigid downwards as a result of either minimum wage legislation of unionization, or both.

Thus, in the absence of industrial exports, the shortfall of export earnings will work its way through the economy almost entirely through the foreign trade multiplier and the balance of payments will be brought back into equilibrium through a lowering of the level of activity.

If industrial exports do exist, the adjustment mechanism is different. Under these circumstances, when traditional export revenues fall, and the domestic market shrinks, an increased amount of industrial production becomes available for export. Thus, market substitution takes place in the area of non-traditional exports and a reduction in domestic demand results in an increase in foreign exchange earnings on account of non-traditionals. Evidently, this market substitution limits the deflation necessary to bring the balance of payments back into equilibrium. Moreover, the increased exports of non-traditionals are feasible by virtue of the smallness of the semi-industrialized economy on the world market which allows it to face an infinitely elastic demand for its non-traditional export products.

C. Implications of the Adjustment Process

An adjustment mechanism that relies fundamentally on deflation of economic activity is a very costly one. It implies that whenever exports turn down, unemployment of labor and of installed capacity will ensue, and, moreover, balance of payments induced cycles of domestic activity will be the rule. Under such circumstances, counter cyclical policy based on offsetting fluctuations in domestic demand are not feasible for they will automatically induce balance of payments deficits which are not financeable in the long run unless reserves are built up during the boom years to be run down during the slack. The existence of non-traditional exports provides an indispensable cushion under such circumstances, for it allows the excess supply resulting from domestic demand deflation consequent to short-falls in traditional exports to spill into the foreign market, earn foreign exchange, and maintain income levels in industrial and to some extent service production. Thus, when non-traditional exports are present, the multiplier effects of a reduction in traditional export earnings is contained principally within the traditional export sector, due to the offset occuring in industrial exports thanks to market substitution. It follows therefore that instituting an export promotion policy for non-traditionals is an important policy tool for reducing the vulnerability of small semi-industrialized economies to external shocks affecting their traditional exports.

It is important to note that the counter-cyclical role of non-traditional exports noted above is additional to any averaging effect that a more diversified structure of exports may provide. Thus non-traditional exports in fact do double duty:

(i) by their mere existence they reduce the average shortfall of export revenue below what it would otherwise be; and

(ii) by their market switching capacity they automatically expand in volume when the traditional export revenue falls.

This paper is concerned with the second of these effects however the relative quantitative importance of each of the effects will naturally vary by country and circumstance.

II

MULTISECTORAL MODELS OF ADJUSTMENT TO EXPORT SHORTFALLS

This section is intended to set out the structure of models capable of describing the response of semi-industrialized economies to export shortfalls. At the same time the specification for the simulation of the following section is exposited.

A. Types of Shock and Types of Adjustment

Export shortfalls can come in two polar forms:

(i) the quantity sold can decrease but the price stay unchanged; and

(ii) the price can fall but the quantity sold stay constant.

The first case is typical of a cartelized situation or one in which multinational companies ration selling opportunities amongst their subsidiaries, or it can result from a supply shortfall caused for example by bad weather or a natural calamity. The second case is more typical of the price-taking small country which sells as much as its installed capacity will allow at the going price. The most usual case, however, is a combination of the two polar ones: the price falls and the quantity produced and exported falls in consequence.

Which of the two polar situations occurs, or in what mix they occur together, makes considerable difference. If quantity falls, so does the demand for all inputs into export production and the deflationary impact is spread to suppliers of material inputs as well as to receivers of factor incomes. If price falls at a fixed quantity, there is no reduction in the demand for physical inputs into export production, only the income of the residual income recipient, usually profit and rent receivers, will fall. Hence in this case the deflationary impact is transmitted from the export sectors to the rest of the economy only through a fall in final demand. Evidently in both cases tax revenue will also be affected but again in different ways: in the quantity case both indirect and direct tax revenue from export production will fall, in the price case only profit tax revenue will decrease.

The price-quantity distinction thus requires two different models. Moreover we also need to distinguish the case where non-traditional exports are competitive in the world market from the case where they are not. Thus four models in all are needed. Finally, a hybrid category in which price and quantity adjustments both occur, in accordance to some pre-specified elasticity, also will have two variants according to the absence or presence of non-traditional exports.

B. Quantity-Shock Models

Consider first the case where no non-traditional exports can exist because there is an implicit export tax on them.[1/]

We can write the balance equations for the economy as follows:

$$Q + CM = AQ + F + X + G \qquad (1)$$

where,

Q = gross value of production, a vector

CM = competitive imports, a vector

A = input-output requirements for the kinds of things produced domestically, a matrix

F = domestic final demand, a vector

X = exports, a vector

G = government final demand, a vector

1/ The equations on this case are based on D. M. Schydlowsky, (1978).

Final demand, in turn, depends on factor incomes (after taxes) by sector, v', and the manner in which such income is spent, f. Hence

$$F = fv'Q \tag{2}$$

Note further that the elements of f do not sum to one whenever there is final demand for complementary imports.

Since only traditional exports exist, the export vector will have only a few non-zero elements:

$$X = \begin{pmatrix} X_T \\ 0 \\ 0 \end{pmatrix} \tag{3}$$

where the suscript stands for "traditional".

Competitive imports will exist whenever the total demand for a sector's product exceeds the installed capacity to produce it:

$$CM = pos\ [AQ + F + X + G - Q_{max}] \tag{4}$$

Evidently there will be no competitive imports in the traditional export sector and there will also be none in the service sector for services cannot be traded. Thus in both these types of sectors installed capacity must always be adequate to satisfy demand. This requirement can be satisfied in computation by making Q_{max} very large for the respective sectors.

Replacing (2) and (4) in (1) yields an expression for the level of output as a function of traditional exports:

$$Q = [I - A - fv']^{-1}\ [X + G - pos\ (AQ + fv'Q + X + G - Q_{max})] \tag{5}$$

Note that the multiplier in this case includes not only the direct and indirect material requirements but also the final demand loop. Furthermore, competitive imports are endogenized and determined simultaneously with the output level.

While equation (5) does not have an explicit analytical solution, it can be solved through numerical approximation by means of an iterative gradient algorithm.

Determining the impact of an exogenous reduction in the quantity exported is now quite straightforward. It involves merely solving equation (5) for two different values of X while G and Q_{max} are held constant. The output impact will be equal to the augmented input-output inverse whenever no competitive imports exist, otherwise the output impact is less. In general the income effect of an export change can be written:

$$\lambda_{QT} = \frac{dY}{d1'X_T} = \frac{v'\Delta Q}{1'\Delta X_T} \qquad (6)$$

where 1' is a row vector of ones

In turn, the balance of payments impact will be,

$$\beta_{QT} = \frac{dBOP}{d1'X_T} = \frac{1'\Delta X - 1'\Delta M}{1'\Delta X_T} \qquad (7)$$

where,

$\Delta M = \Delta CM + m'\Delta Q + f_m v'\Delta Q$

m = complementary import coefficient vector for intermediate inputs

f_m = complementary import coefficient for final demand.

Finally, the fiscal effect of an export shortfall will be,

$$\phi_{QT} = \frac{dFisc}{d1'X_T} = \frac{t'\Delta Q + t'_c\Delta CM + t'_\pi\Delta\Pi gross}{1'\Delta X_T} \qquad (8)$$

where,

t = indirect tax coefficient (indirect taxes & import duties on non-competitive imports)

t_c = tariff rate on competitive imports

t_π = tax rate on profits (wages are assumed not to pay taxes)

Turn now to the case where non-traditional exports can occur thanks to an appropriate export promotion policy. Now output in the traditional sectors and in services are demand determined as before, but output in the non-traditional export sectors will be supply determined at Q_{NT}^{max} since any excess supply will now be exported. Our model must therefore be disaggregated and separately specify the equations governing traditional, non-traditional and service sectors.

For the traditional sector we have

$$Q_T - A_{T,T}Q_T - A_{T,NT}Q_{NT}^{max} - A_{T,S}Q_S - f_T(v'_TQ_T + v'_{NT}Q_{NT}^{max} + v'_SQ_S) - G_T - X_T = 0 \tag{9}$$

For the non-traditional sectors we have

$$Q_{NT}^{max} - A_{NT,T}Q_T - A_{NT,NT}Q_{NT}^{max} - A_{NT,S}Q_S - f_{NT}(v'_TQ_T + v'_{NT}Q_{NT}^{max} + v'_SQ_S) - G_{NT} - XM_{NT} = 0 \tag{10}$$

where XM_{NT} represents the excess demand for these types of goods. If positive, exports occur; if negative, competitive imports come in.

For services we have

$$Q_S - A_{S,T}\, Q_T - A_{S,NT} Q_{NT}^{max} - A_{S,S} Q_S - f_S (v'_T Q_T + v'_{NT} Q_{NT}$$

$$+ v'_S\, Q_S) - G_S = 0 \qquad (11)$$

This is a system of three equations in three unknowns, Q_T, Q_S and XM_{NT}; its solution merely requires some matrix manipulation which is shown in the appendix.

Quantifying the impact of an exogenous reduction of the quantity exported is again quite direct. However, the precise expressions differ somewhat from equations (6) through (8), since in this case the output level of non-traditionals does not change, while exports of these kinds of commodities exist, and their sale on the world market requires fiscal support from the treasury. The income effect of an export change can therefore be written as follows:

$$\lambda_{QNT} = \frac{v'\Delta Q}{1'\Delta X_T} = \frac{v'_T \Delta Q_T + v'_S \Delta Q_S}{1'\Delta X_T} \qquad (12)$$

In turn, the balance of payment impact will be,

$$\beta_{QNT} = \frac{1'\Delta X_T + 1'\Delta X_{NT} - 1'\Delta M}{1'\Delta X_T} \qquad (13)$$

where all exports are defined at fob prices and all imports defined at cif prices, and ΔM is defined as in equation (7).

Finally, the fiscal effect of an export short-fall will be,

$$\phi_{QNT} = \frac{t'\Delta Q + t_c' \Delta CM - t_s' \Delta X_{NT} + t_{\Pi}' \Delta \Pi \text{ gross}}{1'\Delta X_T} \tag{14}$$

Where all symbols are in equation (8) and t'_s represents the subsidy rates on non-traditional exports.

C. Price Shock Models.

Consider again first the case where no non-traditional exports are feasible. The balance equation for the economy continues to be as shown in equation (1):

$$Q+CM = AQ + F + X + G \tag{1}$$

The short-fall in export prices will affect factor incomes, therefore in this case we need to disaggregate the final demand vector into its components,

$$F = fW_1 + f\Pi_1(1-t_\pi) + fd'Q \tag{15}$$

where the subscript 1 indicates that we are in a price shock model and d' is a vector of depreciation allowances.

The total real expenditures of wage earners will be equal to their nominal wages plus any gain they have from the reduction in the price of the export goods they purchase. Thus,

$$W_1 = w'Q - P'fW_1 = (1+P'f)^{-1}w'Q \tag{16}$$

where P is a vector of increases of prices of output in the economy (negative for a price reduction).

Real expenditure from profits are a bit more complicated. Profitability goes down because export revenue has fallen. Moreover, the price of domestic sales to intermediate use and to final use has fallen together with the export price, thus causing further loss of revenue. One sector's loss of revenue on account of intermediate sales, however, is another sector's gain. Thus in the aggregate, the changes in profitability due to the price fall on the intermediate sales cancel out. Losses to entrepreneurs from sales for final use to themselves also cancel out. Thus the only loss to aggregate profits from domestic operations accrues on domestic sales for final use to wage earners.

$$\Pi_1 = \pi'Q + P'X + P'fW_1 \qquad (17)$$

Inserting equation (16) into (17) we obtain

$$\Pi_1 = \pi'Q + P'X + P'f(1+P'f)^{-1} w'Q \qquad (18)$$

replacing (18) and (16) in (15) and the latter in (1) and (4) yields expressions for output and competitive imports as follows:

$$Q = \{I-A-f[(1+P'f(1-t_\pi) \quad (1+P'f)^{-1}w'+\pi'(1-t_\pi)+d']\}^{-1}$$

$$[X + (1-t_\pi)P'X+G-CM] \qquad (19)$$

$$CM = AQ+f[1+P'f(1-t_\pi) \quad (1+P'f)^{-1}w'+\pi'(1-t_\pi)+d']Q \qquad (20)$$

$$+ (1-t_\pi) P'X + X + G - Q_{max}$$

Again, the summary statistics on income, balance of payments and fiscal effects can easily be written down.

When non-traditional exports can exist, it is necessary to operate again with a system of simultaneous equations for traditional, non-traditional and service sectors.

For traditional sectors we have:

$$Q_T - A_{T,T}Q_T - A_{T,NT}Q_{NT} - A_{T,S}Q_S - f_T[W_1+\Pi_1+D_1] - G_T - X_T = 0 \qquad (21)$$

Factor incomes need to be disaggregated as well in this case, however, and thus we have

$$W_1 = (1+P'f)^{-1}w'Q = (1+P'f)^{-1}[w'_T Q_T + w'_{NT}Q_{NT} + w'_S Q_S] \qquad (22)$$

$$\Pi_1 = (1-t_\pi)\ [\pi'_T Q_T + \pi'_{NT}Q_{NT} + \pi'_S Q_S + P'fW_1 + P'X_T] \qquad (23)$$

$$D_1 = d'_T Q_T + d'_{NT}Q_{NT} + d'_S Q_S \qquad (24)$$

The corresponding equations for non-traditional sectors and services are as follows:

$$Q_{NT} - A_{NT,T}Q_T - A_{NT,NT}Q_{NT} - A_{NT,S}Q_S - f_{NT}[W_1+\Pi_1+D_1] - G_{NT} - XM_{NT} = 0 \qquad (25)$$

$$Q_S - A_{S,T}Q_T - A_{S,NT}Q_{NT} - A_{S,S}Q_S - f_S[W_1+\Pi_1+D_1] - G_S = 0 \qquad (26)$$

The matrix manipulations necessary for the solution are shown in the appendix.

The summary expressions for the impact of changes in exports on income, balance of payments and fiscal situations are unchanged from previous expressions.

D. Mixed Models

Consider now the situation where the quantity of traditionals exported is a function of the price obtainable on the world market in accordance with some supply elasticity. Under such circumstances any specified change in price would be paired with a specific change in quantity. Correspondingly, the effect on the economy would be the combined effect of the price and quantity changes. The simulation of the effects of a combined price-quantity shock can most easily be undertaken by dividing the total effect into its price and quantity components and then applying the appropriate pure model to each of them.

Such a division can be undertaken as follows:

Call the proportionate change in export revenue:

$$\dot{v} = \frac{\bar{P}_o X_o - P_1 X_1}{\bar{P}_o X_o}$$

where v is the value of exports, $\bar{P}$ is the vector of export prices and X the vector of export quantities, with the subscrips denoting initial (o) and new (1) levels and $(\cdot)$ is proportioned change. Now decompose:

$$\frac{\bar{P}_o X_o - \bar{P}_1 X_1}{\bar{P}_o X_o} = \frac{\bar{P}_o X_o - \bar{P}_o X_1 + \bar{P}_o X_1 - \bar{P}_1 X_1}{\bar{P}_o X_o} =$$

$$\frac{\bar{P}_o (X_o - X_1) + (\bar{P}_o - \bar{P}_1) X_1}{\bar{P}_o X_o} = \frac{X_o - X_1}{X_o} + \frac{(P_o - P_1) X_1}{\bar{P}_o \quad X_o}$$

$$\dot{v} = \dot{x} + \dot{p}(1-\dot{x}) \tag{27}$$

where:

$\dot{x} = 1'X$

$\dot{p} = 1'P$

Moreover, by definition: (28)

$\dot{x}_i = e_i\dot{p}_i$

where e_i is the export supply elasticity for vector i. Hence,

$$\dot{v}_i = e_i\dot{p}_i(1-e_i\dot{p}_i) \tag{29}$$

Therefore, in order to determine for any given elasticity what part of the percentage fall in revenue is due to the price effect, and what part is due to fall in the quantity, it is necessary to solve the following equation:

$$\dot{e}_i\dot{p}_i{}^2-(1 + e_i)\dot{p}_i + \dot{v}_i = 0 \tag{30}$$

With this division undertaken, the income, BOP and tax effects are then built up by applying (27) to the multipliers developed in the previous two sections. Thus, for instance, in the absence of non-traditional exports, the income effect of a change in export revenue will be:

$$\lambda_{MT} = \frac{dy}{dv} = \frac{1}{\dot{v}} \{\dot{x}\ \lambda_{QT} + (1-\dot{x})\dot{p}\ \lambda_{PT}\} \tag{31}$$

III

SIMULATION RESULTS FOR PERU

A. The Setting and the Data

Peru in the late 1970's is a good case on which to try out the models developed in the previous section.1/ Since 1969, Peru followed a very aggressive import substitution policy, using increasingly severe import licensing to restrict purchases abroad to only those things which could not possibly be produced at home. The result was exclusive dependence for export revenue on primary production and the discouragement of non-traditional exports. It is only at the beginning of 1979, after it was abundantly clear that the previous ten years of policy had led to an extraordinary disaster, that Peruvian foreign trade policy took a turn and that export promotion of non-traditionals was aggressively undertaken. The result has been the doubling of non-traditional exports in one year as well as a very considerable increase in the range of products exported.

While Peru's economic debacle of 1975, which included a 10% per capita drop in GNP over the next years, was not principally due to terms of trade effects, the loss in purchasing power of Peru's exports certainly helped make matters worse. Moreover, the limitation of Peruvian industrial production to the domestic market certainly was an important element in the depth of the depression which occurred, for it has been abundantly demonstrated during 1979 that Peruvian industry had the capability of selling abroad if the incentive

1/For a close look at ten years of recent Peruvian economic history, see Schydlowsky and Wicht (1979).

structure was right. Moreover, it has also been demonstrated that the installed capacity to sell in volume was there. Hence, a counter cyclical policy through market substitution for non-traditional exports was clearly a feasible policy option for Peru in 1975.

A Peruvian input-output table is available for 1969 and has been used for the simulation exercise. However, in 1969 Peru still imported a fair amount of competitive imports. These were subsequently eliminated by policy. Thus, to approximate the situation in the late 1970's, the 1969 input-output table has been updated by distributing the competitive imports to using sectors, treating them as non-competitive imports. In the absence of new empirical data on the structure of current non-competitive imports, this procedure is an adequate approximation.

Productive capacities were taken in the simulation as equal to the observed levels of output in 1969. This does not correspond to reality, for even in 1969 installed capacity in non-traditional and service sectors was significantly above the realized values, and this capacity has since grown considerably. However, incorporating a larger capacity figure in our simulations would introduce an extraneous element into the comparisons. We wish to isolate the effect of market substitution as an anti-cyclical automatic compensatory mechanism. If the real capacity levels are used in the simulation, a change of policy towards promoting non-traditionals will show up in the simulation calculation as an absorption of that capacity and the generation of vast amounts of non-traditional exports. These would result not only from the substitution of markets, but also from the utilization of previously idle capacity. Although such results would be correct reflections of reality as regards the effects of a change in policy towards non-traditional exports, they obviously do not correctly measure the potential for market substitution. When capacity utilization is held constant, however, it is possible to isolate the market substitution effect.

B. Results and their Implications

Table III.B.1 shows the various multipliers obtaining in Peru upon a ten percent reduction[1/] in either the quantity or the price of Peru's basket of traditional exports; the mixed case involving supply elasticities are shown in the III.B.3 and will be discussed later.

Consider first the impacts on income. Without non-traditional exports, income will fall by more than twice as much as exports, whether quantity or prices vary. In the presence of non-traditional exports, the income fall is buffered most considerably. The buffering is particularly strong in the case of quantity variations, where the corresponding multiplier falls from 2.3 to 0.99. In the case of price variation, the multiplier falls from 2.5 to 1.3. There is no question, then, that market substitution in the non-traditional exports sector reduces very substantially the vulnerability of the small semi-industrialized economy to export shocks.

Of interest as well is the relative situation as between quantity and price variations. Whether or not non-traditional exports exist, the economy appears to be more sensitive to price than to quantity variations. This is rather unexpected because one would think that with the impact of price variations contained initially to profits, as compared to the impact of quantity variations which affect all material inputs as well as the labor requirements, quantity variations would have a higher overall impact.

1/ Note that increases may not be symmetrical in their effects because of limitation on domestic productive capacity (cf. eq. (4)).

TABLE III.B1

Simulation Results

	Income Multiplier	
	Q - Variation	Price Variation
Without Non-Traditional Exports	2.263	2.499
With Non-Traditional Exports	0.987	1.311
	Wage Bill Multiplier	
	Q - Variation	Price Variation
Without Non-Traditional Exports	1.010	.272
With Non-Traditional Exports	.401	.312
	Profit & Depreciation Bill Multiplier	
	Q - Variation	Price Variation
Without Non-Traditional Exports	1.253	2.227
With Non-Traditional Exports	.586	1.623
	BOP and Fiscal Multipliers	
	Q - Variation	Price Variation
Without Non-Traditional Exports	.541	.592
With Non-Traditional Exports	0.423	.486

It appears that the contrary occurs as a result of the relative incidence of the various leakages. It must be remembered that in all these models, the leakages from the income stream are imports, indirect taxes and profit taxes. Under quantity variation, there are leakages into imports and indirect taxes on impact, under price variation, such leakages do not exist. On the other hand, under quantity variation, the change of profits on impact is smaller than under price variation, hence the leakage into profit taxes will be proportionately smaller as well. Whether the leakage on impact is greater from quantity variation or price variation therefore depends upon the relative size of the import coefficient, the indirect tax coefficient and the profit tax rate.

Table III.B.2 tabulates income multipliers at different profit tax rates. It will be noticed that as the profit tax rate rises, the multiplier for price variation falls with regard to quantity variation. This is quite consistent with expectation since as the profit tax rate rises, the leakage through this fiscal instrument becomes greater relative to the other leakages and it is this leakage which is particularly effective in the price variation case.

It is also interesting to note that the stabilizing impact of non-traditional exports is relatively greater under quantity variation than under price variation. This makes sense once again if we recall that the initial impact under quantity variation is considerable on the demand for intermediate goods. Thus, under quantity variation, there is an immediate reduction in demand for inputs and therefore a greater freeing up of non-traditional export capacity. Under price variation, this does not occur for the initial impact is exclusively through final demand.

TABLE III.B.2

Sensitivity to Profit Taxation

Income Multiplier

Q-Variation			P- Variation	
Without NTX	With NTX	Profit Tax Rate	Without NTX	With NTX
1.65	0.83	35%	1.26	0.76
2.04	0.93	20%	2.03	1.12
2.20	0.97	15%	2.36	1.25
2.26	0.99	13%	2.50	1.31

The effect on non-traditionals on the functional income distribution can also be seen from Table III.B.1 In the quantity variation case, the buffering favors wages slightly at the expense of profits; this probably results from the particular configuration of Peruvian numbers. However, the price variation case is more substantive for in this case the existence of non-traditionals implies an improvement on the real wage bill when prices fall. It would appear, then, that in this case the real income gain from the price fall outweighs the nominal income loss from lower activity (and the reverse when prices rise).

The balance of payments and fiscal multipliers are shown together because they are identical in value. This results from the construction of the models in which there is only a single domestic leakage (taxes) and only a single foreign leakage (imports). It is remarkable that the amount of buffering which non-traditional exports can provide the balance of payments and fiscal situations is considerably less than it provides to the income level. While for the latter the buffering is about 50 percent, for the balance of payments and fiscal multipliers it is merely 20 percent. Moreover, there is no major difference visible between quantity and price adjustments in this case.

We now turn to the results from the mixed adjustment model shown in Table III.B.3. Evidently, the mixed multipliers will lie between the values for the polar cases and will be closer to the quantity case the higher the supply elasticity is. Correspondingly, the buffering available from non-traditional exports is also a mix of the pure quantity and price buffering. This mixing leads to particularly interesting results for the wage bill; with an elasticity of 0.745 the wage bill is completely insulated from fluctuations in export revenue.

TABLE III. B. 3

SIMULATION RESULTS MIXED CASE

INCOME MULTIPLIER

	Price Variation	Mixed Case e=0.2	e=0.4	e=0.6	e=0.8	e=1.0	Quantity Variation
Without Non-Traditional Exports	2.499	2.459	2.430	2.408	2.391	2.378	2.263
With Non-Traditional Exports	1.311	1.256	1.216	1.187	1.163	1.145	0.987

WAGE BILL MULTIPLIER

	Price Variation	Mixed Case e=0.2	e=0.4	e=0.6	e=0.8	e=1.0	Quantity Variation
Without Non-Traditional Exports	0.272	0.397	0.487	0.556	0.609	0.651	1.010
With Non-Traditional Exports	-0.312	-0.191	-0.104	-0.038	0.013	0.054	0.401

PROFIT AND DEPRECIATION BILL MULTIPLIER

	Price Variation	Mixed Case e=0.2	e=0.4	e=0.6	e=0.8	e=1.0	Quantity Variation
Without Non-Traditional Exports	2.227	2.062	1.943	1.853	1.783	1.727	1.253
With Non-Traditional Exports	1.623	1.445	1.315	1.218	1.142	1.082	0.586

BALANCE OF PAYMENTS AND FISCAL MULTIPLIERS

	Price Variation	Mixed Case e=0.2	e=0.4	e=0.6	e=0.8	e=1.0	Quantity Variation
Without Non-Traditional Exports	0.592	0.583	0.577	0.572	0.569	0.566	0.541
With Non-Traditional Exports	0.486	0.475	0.468	0.462	0.457	0.454	0.423

IV

POLICY CONCLUSIONS

Stabilization of domestic economic conditions in the face of fluctuations of prices or quantities of traditional exports has been a main policy goal pursued by national authorities for some time. Most of the emphasis in this connection has been devoted to the stabilization of the prices themselves or to the accumulation of adequate foreign exchange reserves to serve as a buffer in bad times. In this paper we have endeavored to show the role which can be played by non-traditional exports in buffering fluctuations originating in the traditional export sector. Simulation results for Peru show that 50 percent or more of the income fluctuations resulting from changes in export earnings can be offset through the automatic mechanism of market substitution if non-traditional exports exist. Moreover, the balance of payments and fiscal impacts of fluctuations are also reduced by approximately 20 percent. Such results warrant the inclusion of non-traditional export promotion policy in the arsenal of economic stabilization tools.

Policy measures to promote non-traditional exports are well known from other contexts. They consist essentially of alternative means for bringing the export exchange rate into line with cost exchange rates either by refunding taxation of inputs (traditional drawback and generalized drawback), or by providing compensating subsidies on output, or yet again by adopting a compensated devaluation, in which exchange rate and trade tax system are modified in offsetting fashion, or yet again in combinations involving the preceding. Moreover, internal fiscal and credit measures can be used in complementary fashion. The literature on these measures is extensive and need not be reproduced here. What should be underlined is that the allocational arguments, employment generating arguments and capacity utilization arguments which are traditionally given for promoting non-traditional exports are reinforced by the finding that the existence of such a policy installs an automatic stabilization mechanism which can buffer the small semi-industrialized economy against the fluctuations originating in its primary export sector.

REFERENCES

1. Balasa, B. & Associates, The Structure of Protection in Developing Countries, Johns Hopkins Press, 1971.

2. Balasa, B. & Associates, Incentives for Industrialization in Semi-Industrialized Countries, (forthcoming), 1980.

3. Berlinski, J. & D.M. Schydlowsky, "Incentives for Industrialization in Argentina," Boston University/CLADS, Occasional Paper #1, October, 1977.

4. Little, I.M.D., T. Scitovsky and M. Scott, Industry and Trade in Some Developing Countries: A Comparative Study, Oxford University Press, 1970.

5. Schydlowsky, D.M., "Latin American Trade Policies in the 1970's: A Prospective Appraisal," The Quarterly Journal of Economics, Vol. LXXXVI, May, 1972.

6. Schydlowsky, D.M., "Competitive Imports in Input-Output Analysis: An endogenous treatment," Mimeo., Boston University, March, 1978.

7. Schydlowsky, D.M., & J.J. Wicht, Anatomía de un Fracaso Económico Perú 1968-1978, Lima: Universidad del Pacífico, Fourth Edition, October, 1979.

APPENDIX

SOLUTION OF THE SYSTEMS OF EQUATIONS

1. Quantity Shock Model with Non-Traditional Exports

$$Q_T - A_{TT}Q_T - A_{TNT}Q_{NT}^{max} - A_{TS}Q_S - f_T\,(v'_T Q_T - v'_{NT}Q_{NT}^{max} + v'_S Q_S)$$

$$- \bar{G}_T - \bar{X}_T = 0 \qquad (1)$$

$$Q_{NT}^{max} - A_{NTT}Q_T - A_{NTNT}Q_{NT}^{max} - A_{NTS}Q_S - f_{NT}\,(v'_T Q_T + v'_{NT}Q_{NT}^{max} + v'_S Q_S)$$

$$- G_{NT} - XM_{NT} = 0 \qquad (2)$$

$$Q_S - A_{ST}Q_T - A_{SNT}Q_{NT}^{max} - A_{SS}Q_S - f_S\,(v'_T Q_{ST} + v'_{NT}Q_{NT}^{max} + v'_S Q_S)$$

$$- G_S = 0 \qquad (3)$$

(1) could be written as:

$$RQ_T + SQ_S + T = 0 \qquad (4)$$

where $R = (I - A_{TT} - f_T v'_T)$

$S = -A_{TS} - f_T v'_S$

$T = -A_{NTNT}Q_{NT}^{max} - f_{NT}v'_{NT}Q_{NT}^{max} - \bar{G}_T - \bar{X}_T$

(2) could be written as:

$$UQ_T + VQ_S + W - XM_{NT} = 0 \tag{5}$$

where $U = -A_{NT} - f_{NT}v'_T$

$V = -A_{NTS} - f_{NT}v'_S$

$W = Q_{NT}^{max} - f_{NT}v'_{NT}Q_{NT}^{max} - G_{NT}$

(3) can be written as:

$$PQ_T + YQ_S + Z = 0 \tag{6}$$

where $P = -A_{ST} - f_S v'_T$

$Y = I - A_{SS} - f_S v'_S$

$Z = -A_{SNT}Q_{NT}^{max} - f_S v'_{NT}Q_{NT}^{max} - G_S$

From (4):

$$Q_T = R^{-1}(-SQ_S - T) \tag{7}$$

From (6) and (7):

$$Q_S = (Y - PR^{-1}S)^{-1}(PR^{-1}T - Z) \tag{8}$$

(8) solves for Q_S, solution of Q_S is replaced in (6) and obtained Q_T. Q_S and Q_T are replaced in (5) and obtain XM_{NT}.

2. Price Shock Model with Non-Traditional Exports

$$Q_T - A_{TT}Q_T - A_{TNT}\bar{Q}_{NT} - A_{TS}Q_S - f_T \{ (1 + P'_f)^{-1} (w'_T Q_T + w'_{NT}\bar{Q}_{NT}$$

$$+ w'_S Q_S) + (1 - t_\pi) [\pi'_T Q_T + \pi'_{NT}\bar{Q}_{NT} + \pi'_S Q_S + P'_f (1 + P'_f)^{-1}$$

$$(w'_T Q_T + w'_{NT}\bar{Q}_{NT} + w'_S Q_S) + P'X_T] + (d'_T Q_T + d'_{NT}\bar{Q}_{NT} + d'_S Q_S)\}$$

$$- G_T - X_T = 0 \qquad (1)$$

$$\bar{Q}_{NT} - A_{NTT}Q_T - A_{NTNT}\bar{Q}_{NT} - A_{NTS}Q_S - f_{NT} \{ (1 + P'f)^{-1} (w'_T Q_T$$

$$+ w'_{NT}\bar{Q}_{NT} + w'_S Q_S) + (1 + t_\pi) [\pi'_T Q_T + \pi'_{NT}\bar{Q}_{NT} + \pi'_S Q_S$$

$$+ P'_f (1 + P'_f)^{-1} (w'_T Q_T + w'_{NT}\bar{Q}_{NT} + w'_S Q_S) + P'X_T] + (d'_T Q_T$$

$$+ d'_{NT}\bar{Q}_{NT} + d'_S Q_S)\} - G_{NT} - XM_{NT} = 0 \qquad (2)$$

$$\bar{Q}_S - A_{ST}Q_T - A_{SNT}\bar{Q}_{NT} - A_{SS}Q_S - f_S \{ (1 + P'_f)^{-1} (w'_T Q_T + w'_{NT}\bar{Q}_{NT}$$

$$+ w'_S Q_S) + (1 - t_\pi) [\pi'_T Q_T + \pi'_{NT}Q_{NT} + \pi'_S Q_S + P'_f (1 + P'_f)^{-1}$$

$$(w'_T Q_T + w'_{NT}\bar{Q}_{NT} + w'_S Q_S) + P'X_T] + (d'_T Q_T + d'_{NT}\bar{Q}_{NT} + d'_S Q_S)\}$$

$$- G_S = 0 \qquad (3)$$

(1) (2) and (3) can be written as:

$$Q_T - A_{TT}Q_T - A_{TNT}\bar{Q}_{NT} - A_{TS}Q_S - f_T \{ (w'_TQ_T + w'_{NT}\bar{Q}_{NT} + w'_SQ_S) P$$
$$+ (1 - t_\pi) (\pi'_TQ_T + \pi'_{NT}\bar{Q}_{NT} + \pi'_SQ_S + P'X_T) + (d'_TQ_T + d'_{NT}\bar{Q}_{NT}$$
$$+ d'_SQ_S)\} - G_T - X_T = 0 \qquad (4)$$

$$Q_{NT} - A_{NTT}Q_{NT} - A_{NTNT}\bar{Q}_{NT} - A_{NTS}Q_S - f_{NT} \{ (w'_TQ_T + w'_{NT}\bar{Q}_{NT} + w'_SQ_S) P$$
$$+ (1 - t_\pi) (\pi'_TQ_T + \pi'_{NT}\bar{Q}_{NT} + \pi'_SQ_S + P'X_T] + (d'_TQ_T + d'_{NT}\bar{Q}_{NT} +$$
$$d'_SQ_S)\} - G_{NT} - XM_{NT} = 0 \qquad (5)$$

$$Q_S - A_{ST}Q_T - A_{SNT}\bar{Q}_{NT} - A_{SS}Q_S - f_S \{ (w'_TQ_T + w'_{NT}\bar{Q}_{NT} + w'_SQ_S) P$$
$$+ (1 - t_\pi) (\pi_T'Q_T + \pi'_{NT}\bar{Q}_{NT} + \pi'_SQ_S + P'X_T) + (d'_TQ_T + d'_{NT}\bar{Q}_{NT}$$
$$+ d'_SQ_S)\} - G_S = 0 \qquad (6)$$

where $P = (1 + P'_f)^{-1} + P'_f(1 - t_\pi) (1 + P'_f)^{-1}$

From (4):

$$[I - A_{TT} - f_T (w'_TP + (1 - t_\pi) \pi'_T + d'_T)] Q_T + [- A_{TS} - f_T$$
$$(w'_SP + (1 - t_\pi) \pi'_S + d'_S)] Q_S + [- A_{TNT} - f_T (w'_{NT}P + (1 - t_\pi) \pi'_{NT}$$
$$+ d'_{NT})] \bar{Q}_{NT} - f_T (1 - t_\pi) P'X_T - G_T - X_T = 0 \qquad (7)$$

From (5):

$$[- A_{NTT} - f_{NT} (w'_T P + (1 - t_\pi) \pi'_T + d'_T)] Q_T + [- A_{NTS} - f_{NT} (w'_S P + (1 - t_\pi) \pi'_S + d'_S)] Q_S + [I - A_{NTNT} - f_{NT} (w'_{NT} P + (1 - t_\pi) \pi'_{NT} + d'_{NT})] \bar{Q}_{NT} - f_{NT} (1 - t_\pi) P'X_T - G_{NT} - XM_{NT} = 0 \quad (8)$$

$$[- A_{ST} - f_S (w'_T P + (1 - t_\pi) \pi'_T + d'_T)] Q_T + [I - A_{SS} - f_S (w'_S P + (1 - t_\pi) \pi'_S + d'_S)] Q_S + [-A_{SNT} - f_S (w'_{NT} P + (1 - t_\pi) \pi'_{NT} + d'_{NT})] \bar{Q}_{NT} - f_S (1 - t_\pi) P'X_T - G_S = 0 \quad (9)$$

(7) (8) and (9) can be written as:

$$[I - A_{TT} - f_T F_T] Q_T + [- A_{TS} - f_T F_S] Q_S + [-A_{TNT} - f_T F_{NT}] \bar{Q}_{NT} - f_T (1 - t_\pi) P'X_T - G_T - X_T = 0 \quad (10)$$

$$[- A_{NTT} - f_{NT} F_T] Q_T + [-A_{NTS} - f_{NT} F_S] Q_S + [I - A_{NTNT} - f_{NT} F_{NT}] \bar{Q}_{NT} - f_{NT} (1 - t_\pi) P'X_T - G_{NT} - XM_{NT} = 0 \quad (11)$$

$$[-A_{ST} - f_S F_T]\ Q_T + [I - A_{SS} - f_S F_S]\ Q_S + [-A_{SNT} - f_S F_{NT}]\ \bar{Q}_{NT}$$

$$- f_S\ (1 - t_\pi)\ P'X_T - G_S = 0 \qquad (12)$$

where $F_T = w'_T P + (1 - t_\pi)\ \pi'_T + d'_T$

$$F_S = w'_S P + (1 - t_\pi)\ \pi'_S + d'_S$$

$$F_{NT} = w'_{NT} P + (1 - t_\pi)\ \pi'_{NT} + d'_{NT}$$

From (10):

$$Q_T = [I - A_{TT} - f_T F_T]^{-1}\ [(A_{TS} + f_T F_S)\ Q_S + (A_{TNT} + f_T F_{NT})\ \bar{Q}_{NT}$$

$$+ f_T\ (1 - t_\pi)\ P'X_T + G_T + X_T] \qquad (13)$$

Replace (13) in (12)

$$[-A_{ST} - f_S F_T]\ [I - A_{TT} - f_T F_T]^{-1}\ [(A_{TS} + f_T F_S)\ Q_S + (A_{TNT} + f_T F_{NT})\ \bar{Q}_{NT}$$

$$+ f_T\ (1 - t_\pi)\ P'X_T + G_T + X_T] + [I - A_{SS} - f_S F_S]\ Q_S + [-A_{SNT}$$

$$- f_S F_{NT}]\ \bar{Q}_{NT} - f_S\ (1 - t_\pi)\ P'X_T - G_S = 0 \qquad (14)$$

$$Q_S = A^{-1}\ B$$

Where $A = [-A_{ST} - f_S F_T][I - A_{TT} - f_T F_T]^{-1} (A_{TS} + f_T F_S)$

$$+ [I - A_{SS} - f_S F_S]$$

$$B = [A_{ST} + f_S F_T][I - A_{TT} - f_T F_T]^{-1} \{(A_{TNT} + f_T F_{NT}) Q_{NT}$$

$$+ f_T (1 - t_\pi) P'X_T + G_T + X_T \} + (A_{SNT} + f_S F_{NT}) \bar{Q}_{NT}$$

$$+ f_S (1 - t_\pi) P'X_T + G_S$$

Replace solution of Q_S in (12) and obtain Q_T. Then replace Q_S and Q_T in equation (11) to obtain XM_{NT}.

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